DURABLE CONSUMER PRODUCTS AND THE HANDICAPPED PERSON: AN EXPLORATORY STUDY

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ACKNOWLEDGEMENT

The uniqueness of this study is derived from the fact that it combines information from a number of sources. These sources include the fields of rehabilitation, market analysis and product testing.

Because this study was a "first of a kind" it depended for co-operation on a wide range of people. Everyone contacted was eager to supply information. A special note of thanks is extended to the Department of Occupational Therapy at Chedoke McMaster Hospital under the directorship of Mr. Mike Dalby. This department gave readily of their time and expertise. Ms. Nancy Downing, Policy Analyst with the Consumer Research and Evaluation Branch of Consumer and Corporate Affairs, provided valuable expertise and collegial support.

Finally, the panels of handicapped consumers and trade association representatives are to be thanked.

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PART I - INTRODUCTION

1.1 Importance of the Topic

While there is growing a general consumer articulation of dissatisfaction with many goods and services[1], there is also a new sensitivity that not all consumers are being considered in the production and delivery of these goods and services. For example, a recent study[2] of the Department of Consumer and Corporate Affairs Consumer Research and Evaluation Branch (CREB), recently focused on the impact of new banking technologies on special populations or market segments.

The need for information on one special group - the physically handicapped[3] - has led to the commission of this exploratory study.

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1. Stephen B. Ash, Consumer Satisfaction, Dissatisfaction and Complaining Behaviour. Consumer and Corporate Affairs Canada, Ottawa, 1979.

2. Michael Gurstein, The Social Impact of Electronic Funds Transfer. Consumer and Corporate Affairs Canada, Ottawa, 1981.

3. For the purpose of this study, a handicapped consumer is an individual between 18-50 years of age with one or more functional limitations resultant from a physical impairment. Please see Part II for a fuller description.

Dr. Stephen Ash[4] in his study on consumer satisfaction/ dissatisfaction suggests:

> ...there is a growing belief that the measurement of consumer satisfaction should assume a major role in the assessment of market performance. This notion is widely held by marketing practitioners who view the satisfaction of consumer needs as the principal goal of marketing activity.

In the first instance the typical consumer is generally perceived as young, middle-class, able-bodied and to a diminishing extent, male. Advertising communicates and reinforces this myth. Recent years have witnessed challenges to this with particular amelioration in the areas of race, women and age. The population known as the handicapped have yet to be comprehensively addressed.[5] There appears to be avoidance of this issue through the relegation of handicapped people to the status of invisible. In other words, the handicapped do not appear in the range of advertising modes. This can produce the impression that handicapped consumers do not exist.

For centuries, individuals with handicaps have been excluded from the mainstream of society. There has also developed a number of myths either to explain how a person becomes handicapped (evil behaviour) or why the person lives (an

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4. Ash, op. cit. p. 2.

5. Some department stores have begun to utilize handicapped people as models for their mail order catalogues. See for example the Simpson-Sears catalogue in major Canadian newspapers of March 7, 1981.

example). The nuances of this have reached into the twentieth century and are expressed in a number of exclusions, often unintentional; yet at other times very subtle.

A second myth follows from this. The consumer who is handicapped is most often portrayed in advertising that solicits charitable donations. This reinforces in the minds of people the notion of the handicapped as charitable needy objects and as such poor individuals (in pocket and spirit) who are only worthy of society's special benefits. This problem has been addressed by a number of people and especially by Bogdan and Biklan6 who talk of the phenomenon as "handicapism". This new "ism" is conspicuous in prevailing attitudes, institutions and is often expressed in society as a number of exclusions from normative activities, including advertising. Thus buildings and homes are constructed that do not allow for easy access; public transportation carriers are equally inaccessible and some have refused entry to handicapped people unless they are accompanied by an able-bodied person. The result is that many other examples of exclusion are evident and reinforce

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6. Robert Bodgon and Douglas Biklan, "Handicapism", Social Policy, April 1977, pp. 14-20.

the myth that there are few if any problems since the handicapped are not visible due to these exclusions![7]

1.2 Purpose of the Study

As Ash[8] suggests, in recent years there has been a great deal of effort to incorporate consumer sentiments. Arguments are put forward that the orientation towards the typically consumer within a particular market segment renders the best economic advantage to producers or manufacturers. Not withstanding this, and as this study will suggest, there are potential market segments heretofore untapped and worth considering.

Indeed, the levels of dissatisfaction amongst the handicapped population appear to be the highest. While other studies examine the satisfaction/dissatisfaction levels in terms of usefulness, the needs of the handicapped suggest that use must be the subject of enquiry before usefulness can be investigated. For, if a product or service cannot even be used, then it follows that one cannot

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7. For additional examples see Government of Canada, Obstacles: Report of the Special Committee on the Disabled and the Handicapped. 3rd Report. Minister of Supply and Services, Ottawa, February 1981.

8. Ash, op. cit. pp. 2-4.

enquire as to its usefulness. This distinction should be kept in mind by the reader.

This study was commissioned by the Consumer Research and Evaluation Branch in December 1980 and completed March 31, 1981. It's terms of reference were set out as:

1. To identify key information sources, including literature on market segmentation analysis, in order to assemble relevant information about selected consumer goods and services required by disabled people.

2. Use previous research by the Levy-Coughlin Partnership to determine a list of major living activities which disabled consumers need and desire to undertake. Use Consumer Satisfaction/Dissatisfaction data to propose a priority list of goods and services on the basis of frequency of use or purchase (supplied by CCAC). Combine these two sets of information to develop a priority list of the most likely market opportunities for goods and services that might be purchased by the disabled.

3. Use panels of representative disabled people in Alberta, Ontario and Quebec to test whether the priority list (developed in (2)) of relevant goods and services for sale, would assist the disabled by reducing daily living inconveniences.

4. Review feasibility of results of (3) during interviews with leading Canadian market associations in relation to supply, distribution and sale of the relevant goods and services.

While the study addressed these objectives it also provides direction for follow-up study and research as a means of stimulating reality and moving away from unfounded social and economic myths. As both a descriptive and exploratory study it provides insight into a market segment, the

physically handicapped, previously unexamined in any depth in Canada. It can be argued that this study is unique and provides a simple, inexpensive method to provide information to policy makers, manufacturers and others. For example, Ash9 quotes Day and Bodur10 concerning the type of information that is necessary to diagnose consumer dissatisfaction with products and services.

1. Number of users in the population.
2. Proportion of users expressing dissatisfaction with the item.
3. The degree of importance associated with the consumption of a product or service; and
4. How consumers resolve their dissatisfaction with an item.

This study presents estimates of (1) and (2); (3) and (4) are examined; and, it presents a cross-section of opinion on the impact of durable product design on handicapped consumers.

To accomplish this several research tasks were undertaken and are described in Part III - Methodology.

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9. Ash, op. cit.

10. Ralph L. Day and Muzaffer Bodur, "A Comprehensive Study of Satisfaction with Consumer Services", in Ralph L. Day (ed). Consumer Satisfaction and Complaining Behaviour, Division of Research, Indiana University, 1977, pp. 64-74.

In commissioning this study, Consumer Research and Evaluation Branch officials would like that the results serve as valuable input to companies interested in examining their relationship to the physically handicapped market segment. Sensitivity to the issues presented in this report may provide a competitive edge for some firms.

This year 1981 has been declared by the United Nations, the International Year of Disabled Persons. For many, IYDP cam as a surprise, for others it was awaited as a special avenue to push society through a number of important changes which will facilitate the social and economic integration of people with physical impairments. One such area, addressed by this study, is the use and usefulness of consumer products by the handicapped.

Many manufacturers are often reluctant to make changes to their product especially if there are no economic returns. When a market segment is depicted as impecunious, then the conventional wisdom assumes there is no demand. Often, the effects of this conventional wisdom have been the imposition of nonusable products on a sizable population with access to money. This study uncovers a number of myths which can supplant this conventional wisdom.

PART II - BACKGROUND

2.1 Several General Observations About the Handicapped

Estimates of the handicapped population range from a low of 2% of the total population to a high of 25% or morell. Generally, it is accepted that almost 10% of the population in this country have a physical impairment. This translates into 2.2 million citizens in Canada.

Impairments include the absence of a limb, a cardiovascular problem, an absence of hearing or speech or sight, or some other loss or lack of body part or function. However, not every impairment is necessarily a physical handicap.

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11. For the purpose of this study, two demographic surveys have been used for definitional purposes and statistical estimates. These are:

Netherlands. The Physcially Handicapped in the Netherlands, The Hague, Netherlands Central Bureau of Statistics, 1976.

Amelia I. Harris. The Handicapped and Impaired in Great Britain, London, Office of Population Censuses and Surveys, H.M.S.O. 1971.

Further, in May 1981, "The Demographic and Need-Related Characteristics of the Physically Handicapped in Ontario" study will be released. It will serve to provide information on who the handicapped are, their numbers and their needs.

The Levy-Coughlin Partnership acted as the principal researchers for this study.

In addition, a data bank will be set up to provide more specific information. For example if one required information on a certain condition (say, mobility problems) in a region of Ontario, or by age, this could be provided by the data bank.

The definitions below may be found to be useful.

Physical Impairment

Is the absence of an organ or part of the body or a restriction on that organ or part of the body. In and of itself the actual impairment can lead to a loss of function.

Functional Limitation

Is the absence or reduction of the function of a part of the body which results from the physical impairment. This functional loss can mean the reduction or absence of the ability to run, talk, move or lift. It may leave an individual in a dependent state on either people, aids or devices. However, when a disability makes one conspicuous (socially, economically, physically) then the disability becomes a handicap.

Physical Handicap

Is the effect of societal or environmental demands on a person who has a physical impairment. Handicaps can usually be the result of social attitudes, unreasonable demands, unreasonable architectural structures, poor product design, or irrational fears.

When physical impairments are translated into a functional impact on parts of the body, it is often found that the following areas are affected. Subsequently the ability to use these areas becomes problematic in a number of situations:

- Hands, fingers, arms
- Feet, legs, hip, pelvis
- Multiple - musculoskeletal
- Eyes
- Ears
- Internal organs
- Spine, trunk
- Nerves

Sometimes problems of strength or endurance result from a heart condition; or, height is lowered by sitting in a wheelchair. Whatever the manifestation of an impairment, the result can make a person dependent and thus handicapped.

Most physical impairments result in more than one functional limitation. It is common knowledge that the physically handicapped usually have functional limitations in three parts of the body. Each can impede a person's ability to be independent.

Further, most of the handicapped live with at least one other person. Thus one should talk of the handicapped family as a consuming unit whose needs may be similar to the general population, but whose product requirements may require ameliorations for optional use. This then can increase the market segment under study to over four million people!

Another demographic observation that can be made, concerns the number of handicapped people over 50 years of age. A growing number fall into this age cohort and as has been suggested by the birth/death rates in this country, the majority of our population will settle slowly into the older age cohorts. This has serious implications for manufacturers concerned with their future markets. Since one of the prime causes of physical impairment is aging, a greater number of our population will live longer, more comfortably but will also more likely be physically handicapped.

Most of the handicapped population do not any longer live in institutions. In fact, there is now a conscious policy in the Western world to "deinstitutionalize". Often those leaving the institution are the most severely handicapped. Most are younger people seeking a place in the world and an

independent life-style. Confronted by environmental and product constraints, they place political pressure on the system to respond. The larger components including transportation, accommodation, employment and health services have begun to respond. However, those in the private sector can only be influenced by market pressures. These will grow as the population that is handicapped exercises its economic clout. Manufacturers can respond proactively. This study will provide information on several, selected important consumer products - all essential in facilitating the independence of a handicapped person - and on which astute marketing managers may wish to focus.

It has been estimated that because of poor product design, low utilization results. Indeed, about half the handicapped population incur extraordinary costs usually because they must adapt certain products to make them more usable. In interviewing the handicapped it quickly becomes apparent that their daily functioning is too frequently disturbed by poor design thereby continually reminding them of their limitations, not their abilities.

If the environment is to be made normalized, these factors must be taken into account when products are designed. This

allows for universal access and normalization of the environment. It contributes towards the reduction of physical handicaps and subsequently creates new market opportunities.

In the past manufacturers have spent very little time or attention in developing universally accessible products. By this we mean products which are usable by every individual regardless of their functional abilities. Second, manufacturers have traditionally not been aware of the demand for certain products, and the effect this demand can have on sales. We now know that there is a growing number of people with physical impairments who will age. This market in the next few years will grow to the point where more and more people will be physically impaired, and unless certain products are designed to accommodate these impairments, then we will be responsible for the fact that many of our population will also be handicapped. We cannot change the fact that people are physically impaired, however, we can, through sensitive design, alter the fact that they are handicapped. The benefits that can accure to a manufacturer or retailer can be significant if they respond to this need.

2.2 Product Design and Physical Impairment

From the above discussion, a physical impairment can be seen as a condition which results from an accident, birth defect, illness or aging. For example, if someone loses a limb, has a stroke or becomes blind, all these are medical conditions. There is very little one can do to ameliorate these conditions especially when they cause organic damage or loss. If we take a typical condition - paraplegia, which is the paralysis of the lower limbs usually caused by the severance or cutting of the spinal cord at a particular point, we can see several manifestations or functional limitations that result. For example, the person cannot walk, is confined to a wheelchair (which effectively reduces his or her height), cannot move about freely on certain types of flooring, has difficulty reaching, stooping or bending and so on. If one examines this list it becomes apparent that some of the limitations are made manifest by the impairment (i.e. height) while others are the result of poor design (i.e. the floor). To repeat, we cannot ameliorate the physical impairment, but we can through conscious design efforts ameliorate environmental or product constraints.

If we take this situation one step further, we find that the properties or characteristics of products are often the cause of a functional limitation. In other words, if a person cannot reach into a refrigerator, he or she can be handicapped as a result. Multiplying this by the operational requirements of many essential products, we can then say a person can be severely handicapped as a result of being unable to negotiate the demands of these products.

The stresses and strains resultant from the daily nuisance of either not having a product, because of poor design, or not being able to use it can be reduced by one of three ways:

1. The creation of special devices unique to the handicapped and usually very expensive.

2. The adaptation of commercially available products by third parties, usually at the extra expense of handicapped consumers.

3. The use of sensitive design by manufacturers so that products can be used by all people.

If a refrigerator was designed to be shallower, or if the shelves could be pulled our or turned, the individual in a wheelchair could then accure the same benefits of consumer use as an able-bodied person. Sensitive design will not make a product unusable to the majority; it can enhance the attractiveness of a product to a larger market. Everyone can benefit.

For the purpose of this report four conditions will be used to examine the interface between impairments (functional limitations) and operations of products. These conditions are:

Mobility

This is a limitation whereby a person cannot move about freely without the use of an assistive device. The assistive device can be a cane, walker or wheelchair. However, the use of an assistive device in and of itself cannot guarantee mobility.

One step can often impede a person in a wheelchair from moving about freely or a slippery floor can impede a person with balance problems. Mobility will also be expressed as "height", "strength", and "endurance" problems.

Tactile:

This involves the limitations caused by a loss of function in the arms, hands and fingers. It can be expressed as poor co-ordination, a lack of strength, or limited fine motor movement.

Vision:

The partial loss or complete loss of hearing can seriously affect a person's ability to negotiate communication within one's environment.

Hearing:

The partial loss or complete loss of hearing can seriously affect a person's ability to negotiate communication within one's environment.

If one examines Ash's report,12 it is apparent that there are a number of consumer products that have been rated as "poor" by the general population. This report uses a theoretical underpinning the assumption that if the general population has a problem with a product, then someone with a

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12. Ash, op. cit.

physical handicap suffers doubly. Indeed while the general population can at least use it, albeit unsatisfactorily, many handicapped consumers cannot fully utilize or even operate many products.

Further, if we examine the functional limitations that flow from physical conditions or impairments, match these with important activities for daily living (ADL) and break down these areas into essential products, the resulting combinations may indicate important areas for a product design "rethink".

2.3 Activities for Daily Living

The most important aggregate daily living areas which have been identified in a number of studies and are generally rated by the handicapped and occupational therapists as most important are:

1. Cooking
2. Laundry
3. Housekeeping

These general or aggregate categories can be disaggregated into several appliances and then interjoined with specific operations. Usage can be seen as the ability to have functional limitations overcome by sensitive product design.

PART III - METHODOLOGY

The Selected methodology was exploratory in nature and consisted of several distinct, yet interrelated parts:

1. A Review of Consumer Information Sources and Literature
2. Key Informant Interviews
3. Product List Development and Selection
4. Panels of Handicapped Consumers
5. Discussions with Trade Associations
   (Concerning the Results of the Study)

Each will be described.

3.1 A Review of Consumer Information Sources and Literature

A careful review of the extent literature, using both hand and computer search techniques yielded little in the way of information concerning product design and functional limitations of consumers.

Three computerized information retrieval systems were searched: Indicus Medicus, Canadian Business Periodical Index and NARIC in Washington. Appendix 2 contains a

bibliography of the most important sources found and used in the study.

The search of the literature was conducted for the following reasons:

> to draw on the results of similar studies which looked at handicapped consumers in their homes, places of employment, and in the market place.
>
> to review a variety of literature ranging from catalogues of "rehab equipment", "self-help" manuals, and reference material relating to persons with disabilities coping with their environment.

3.2 Key Informant Interviews

A number of key informants (see Appendix 1) were contacted by telephone and in person to discuss the study. They constituted a cross-section of individuals in government, product research and development consumer information systems, national rehabilitation groups and university personnel in Canada and the U.S.A. Each step of the methodology was discussed with key informants and valuable feedback was received. Discussions were open-ended. For example, the selection of the most important activities of independent daily living (such as cooking) and the selection of a number of associated durable products was the content of a meeting with occupational therapists at Chedoke Medical Centre. They confirmed the research assumptions made and supported the investigative approach (see Section 3.3) in researching the issues.

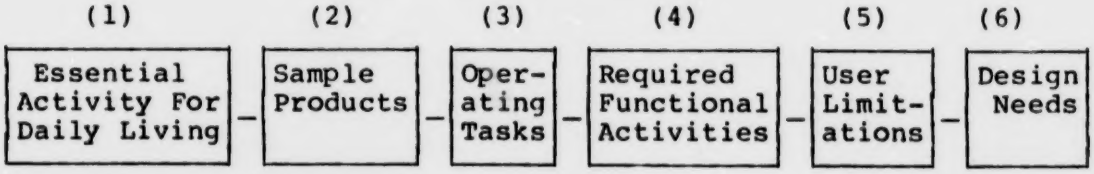
Several informants forwarded copies of documents related to the research or they often provided names of other potential informants. All leads were followed-up.

3.3 Product List Development and Selection

As stated, an exploration of the literature, previous research, discussions with key informants and previous Levy-Coughlin Partnership experience led to the selection of a number of consumer products necessary for independent living.

The development instruments (see Diagram 1 below) is unique and can be adapted to almost any durable product. It follows a simple progression of items and summatively concludes with types of "difficulties in operations" and suggested "ameliorations in design". This represents in proxy format consumer dissatisfaction and satisfaction.

Diagram 1
Product Analysis Guide



Rehabilitation partializes normal life functioning in modularized format. In other words there are a number of aggregate tasks that individuals must perform to be independent. These aggregates include eating, self-care, care of one's environment and so on. They are usually referred to as activities for daily living (ADL).
In this study the selected activities for daily living (1) were drawn based on the needs of handicapped people as expressed in a number of studies. These included food preparation, food storage, clean-up and laundry. This was broken into the selected sample of durable products (2). These included refrigerator, stove, oven, dishwasher and washer-dryers.

The operating tasks (3) were such items as opening, closing, cleaning, reaching-in and so on. These were further disaggregated into specific functional activities (4) required to perform a specific operation. Pulling handles, accessing parts, pushing doors and so on require the user to have certain functional abilities. However, as presented in Section 2.2, the generic types of functional limitations associated with physical impairments of users (5) create usability problems. The panels of handicapped consumers were asked to comment on this paradigm and suggest design (6) modifications.

It is worth noting that this instrument (paradigm) evolved from lengthy and in discussion with occupational therapists. It follows a standard procedure used in the field of rehabilitation and is possibly new to the field of durable product testing with regard to the area of use.

3.4 Panels of Handicapped Consumers

Three groups of handicapped consumers were selected in Calgary, Hamilton and Montreal. Efforts were made to stratify the groups by age, sex and condition. In all, 27 people participated. Each was paid a small honorarium of $10 plus travel expenses.

Candidates were selected in cooperation with three organizations: The Alberta Rehabilitation Council for the Disabled, Chedoke Hospital in Hamilton and The Quebec Society for Crippled Children.

The panels were convened in central physically accessible locations. Groups leaders introduced themselves, the subject matter and explained that the first part of the meeting would examine in a structured format, a number of consumer products. The second part of the meeting would be

opened and participants would be invited to talk about any other products of concern to them. Suggestions for constructive ameliorations to products were encouraged.

They were asked about the selected products along with the required operating tasks. They commented, interactively, on each from personal experience. Notes were taken. Following the structured part of the meeting, the session was opened up to include any other issues or products the groups wished to comment on. The group leader summarized the meeting and asked for additional comments. Each group lasted approximately two hours. Names were recorded and payment was issued by mail.

3.5 Discussion of Results with Trade Associations

Meetings were held with three trade associations:

1. Retail Council of Canada
2. Electrical and Electronic Manufacturers Association of Canada
3. Grocery Products Manufacturers of Canada.

These groups were contacted by a member of the Consumer Research and Evaluation Branch.

Discussions included a brief overview of the study and methodology, the results of the handicapped panels, the available information resultant from the study and ways trade associations might consider using this information.

Information was solicited from these groups concerning their membership, ways to disseminate information and their willingness to do so.

Each representative was asked how the results might serve their member needs. A number of suggestions were provided to them.

3.6 Limitations of the Study

As this was an exploratory and descriptive study, only general inferences can be drawn. It does offer several new insights on handicapped consumer satisfaction/dissatisfaction sentiments regarding a selected number of durable products. Only a limited number of goods and services were researched, given the time constraints of the study. For example, at the onset it was felt that the most important products to the handicapped population should be explored. It soon became apparent that to do this, one had to first understand and select areas of daily living that were most

important to the population under study; that is, areas that determine the difference between independence and dependence. The selected areas (food preparation, food storage and clean-up and laundry) have many durable and nondurable products associated with them. However discussions with occupational therapists and with the handicapped themselves revealed that the products selected were the most important.

Further study could examine other products, possibly using the paradigm developed for this study.

The handicapped panels, while balanced in representation from the four groups - mobility, tactile, hearing and sight problems - revealed that a number of issues cut across all groups, while others were functionally specific.

No baseline data currently exists on handicapped persons perceptions of satisfactory products. It is thus impossible to compare the sentiments expressed in this study with a standardized data set.

PART IV - RESULTS

4.1 Introduction

The results are drawn from the methodological steps outlined in the previous section.

Each provided either primary (original) or secondary data for analysis. However all data sources are interactive insofar as the research required supporting evidence ofr its primary assumption - that handicapped consumers have a number of dissatisfactions about products and services, and that for the most part they have not been actively involved in expressing these sentiments to manufacturers or distributors.

This section presents the results of the study

4.2 Results from a Review of Consumer Information Sources and Literature

Careful searching yielded a selected number of information sources and relevant literature. These findings can be categorized as:

1. Commonly Available Products
2. Special Devices and Aids
3. Product Testing and Usability

Each is discussed separately.

1. Commonly Available Products

The expectation was that many of these resources would point to common consumer items which, because of their design, were accessible to persons with functional impairments or would suggest minor adaptations which enhanced the utility of products for persons with functional impairments.

At the outset of the literature review it was suspected that many available consumer items, because of their particular design, convenience or ease of utility were recommended for use of people with a variety of functional impairments and indeed were often "prescribed" by Occupational Therapists when a disabled individual was being prepared for discharge to home and community.

This 'suspicion' was proven valid when an exhaustive search of 'self-help' books, manuals for independent living, and 'rehab catalogues' was completed. In most cases extensive

lists were generated of articles mentioned in these references which were not designed exclusively for the disabled. Flexible shower hoses, non-slip bath mats, long handled show horns, one-handed squeeze mops and shelf organizers may sound more like an inventory from the local hardware store but in fact are examples of such items mentioned numerous times in self-help manuals for the disabled. Occupational Therapists who have been in the field for a number of ears mention with enthusiasm, food processors, small counter-top ovens, slow cookers and automatic coffee makers, as boons when planning kitchens for disabled homemakers; items which are now readily and inexpensively available.

Similarly, light-weight plastics which are rapidly replacing heavier metals in the design of many household products increase their accessibility to many individuals who have diminished strength, endurance and manual dexterity. Labour saving options on many large appliances such as self-defrost freezers, self-cleaning ovens, no-wax floors and dishwashers can be included here.

2. Special Devices and Aids

Once can speculate that special devices for handicapped people were developed due to the unavailability of normal

products that could be used for daily living needs. This rehabilitation strategy has spawned a number of organizations that produce these special devices or information on them. Several groups include The Canadian Rehabilitation Council for the Disabled, The National Research Council, The Canadian Hearing Society, The Canadian National Institute for the Blind and numerous others in Canada.

Usually these groups provide information on selected products for the handicapped; for example, audible signal devices for the deaf, talking word processors for the blind or power lifts for those in wheelchairs. These products are usually very expensive.

Information on these special devices is generally more readily available than information on normal consumer products and their usability for handicapped people.

Recent years have witnessed a number of excellent information systems whereby an individual can receive solutions to product problems. The National Rehabilitation Information Center (NARIC) in Washington maintains an online computerized system of special aids, equipment and modified products. ABLEDATA, an offshoot of NARIC, is located at the University of Virginia and provides subjective consumer use

information as well as procurement information including cost, availability and evaluation of special products. It is also a computer assisted information system.

The Accent on Living in the U.S.A. is a private data source which handles computerized searches, produces special booklets and evaluates products.

In Canada, computer information systems can be found at CISTI and NRC. Otherwise systems are manual. A new technical aids information service is provided by the B.C. Kinsman Foundation's "Living Resource Centre".

The Technical Aids and Systems for the Handicapped (TASH) market special, unique devices as well as new creations of the National Research Council. This service is located at Sunnybrooke Hospital in Toronto.

A number of organizations, including private sector manufacturers have issued catalogues of aids and devices. There is usually a charge for these catalogues.

A number of other resources exist which respond to handicapped consumer requests for engineering solutions. For example, the Innovative Matching of Problems to

Available Rehabilitation Technology (IMPART) began in 1977 and utilizes existing technology to assist handicapped individuals in vocational and daily living activities. In reviewing one of their summative reports,[13] it was apparent that in the several hundred requests only a dozen or so could be referred to as normal market products. All others were the result of special engineering ingenuity and one-of-a-kind products.

The International Commission on Technical Aids, Housing and Transportation (ICTA) located in Sweden deals with rehabilitation technology and covers special devices and equipment.

Unless a consumer is plugged into the rehabilitation network, it is unlikely that they will know of these potentially helpful services. To search for information on consumer products is time consuming. To locate a special device usually means extra expense.

In either case, the handicapped consumer in this country is faced with the prospect of being economically penalized when wishing to purchase many of the products used by everyone!

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13. Texas Rehabilitation Commission, Innovative Matching of Problems to Available Rehabilitation Technology: Research Utilization Laboratory, Texas, September 1980.

These services exist as an important adjunct to rehabilitative services because consumer products are not readily available nor tested for their functional utility for the handicapped, and because few standards for the normalization of products exist. In one respect these services while helpful to the handicapped, in some ways serve to exclude them from the mainstream of consumerism. Many of these services are within the rehabilitation system, thereby placing handicapped people within the context of 'unhealthy' or 'sick', another social myth.

3. Product Testing and Usability

A number of organizations including the Canadian Paraplegic Association, the Canadian National Institute for the Blind and the Canadian Hearing Society have produced the results of their testing in newsletters, brochures and booklets. Most represent an attempt to find usable products that will not have to be adapted and are readily available.

In Britain there appears to be more activity in this area than in either Canada or the U.S.A. For example, in a recent issue of International Consumer[14] Michael Dunne writes that "handicapped people ... would be better served

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14. Michael Dunne, "Tests for the Handicapped", International Consumer, Vol. XX No., 1, 1980. p. 3.

if more concern was directed to their needs as users of goods and services rather than their role as passive consumers in a mass market." He goes on to track the British experience in the evaluation of standard domestic equipment and interbrand comparative tests. From a number of product testing situations he reports that "features which were advantageous to handicapped users were almost invariably more convenient for normal people as well."

He mentions an exciting and innovative information-producing resource in Britain which makes use of special programming on one of the independent television broadcasting companies. The implications for Canada's Telidon system should be apparent.

Another article in the same issue of International Consumer by Carl Montan[15] underlines the truism that the development of products and services in this society is based on the needs of the "normal" individual. The handicapped represent a most heterogeneous groups with a number of functional limitations arising from each disability or impairment type. However, he quickly points out that the movement towards the standardization of products allows for the

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15. Carl Montan, op. cit. pp 7-12.

aggregation of these manifestations so that designers can be fully cognizant of the user needs of all people.

A final article in the International Consumer by Feeney[16] suggests that the production of goods and services that keep the handicapped in mind can reduce many of the extrinsic causes of handicap and even reduce the numbers of people or incidence of handicap in society. It would also remove many people from the category of special consumers who must incur extraordinary expenses in purchasing special aids or gadgets.

As a background the articles mentioned above all stress the importance of testing products by broadening the definition of the normal consumer. The limited activity in Canada coupled with the fragmented international approaches leaves the impression that given the number of people and the growing number of people who are aging, there remains a fairly lucrative market for those who can incorporate new ergonomic approaches to the design problem.

A number of other efforts have been made by such groups as The American National Society for Testing and Materials (ASTM). In Canada The Canadian Standards Association has

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16. R.J. Feeney, op. cit. pp 29-31.

set up a special committee but it cannot be reported that there is now anything more than this committee.

Occupational Therapists have endeavoured to help persons with handicapping conditions to use techniques and products compatible with their manifested conditions. Klinger, Frieden and Sullivan[17] provide information on simple, tested techniques and small electric appliances for self-care. Most of the equipment discussed can be found in most stores. One additional factor which is underlined in this book, suggests that much of the testing can aid homemakers without physical handicaps.

A similar book[18] in the area of gardening has been published by the Reader's Digest Association in conjunction with the Disabled Living Foundation of Britain. It provides advice on normal garden tool design and techniques.

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17. Judith Klinger et, al., Mealtime Manual for the Aged and Handicapped. New York, Essandess Press, 1970.

18. Reader's Digest Association, The Easy Path to Gardening. 1972.

Johnson, Quarve and Stanton19 have produced a "Product Inventory of Hardware, Equipment and Appliances for Barrier-free Design." A number of products normally available are assessed as to their applicability for handicapped users.

A final Canadian example is Bell Northern,20 which has initiated a human factors group. This group examines how telephone products can be made more accessible to handicapped consumers. At the design stage Bell attempts to build in certain modifications and where this is not possible, then to design special products. They have produced a helpful booklet "Telephone Services for Special Needs". It describes how standard equipment can be used for particular conditions. For example the touch-phone is particularly suitable for use by blind people since it is unnecessary to count the holes as with the rotary dial phone.

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19. Mary D. Johnson et. al., Product Inventory of Hardware, Equipment and Appliances for Barrier-free Design, National Handicap Housing Institute, Minneapolis, n.d.

20. Bell Canada, "Telephone Services for Special Needs", n.d.

4.3 Results from Key Informant Interviews

The varied professional backgrounds of key informants can be seen in Appendix I. Most were interviewed by telephone.

Each was asked for his or her perspective on the stated topic under study and these comments are summarized below, not in any order of importance or priority.

- there is recognition by some experts of the problems caused by poor design

- the traditional response to nonusability of products has been rehabilitative where bio-medical engineering creates one-of-a-kind species or adapts other products.

- many people with physical impairments cannot now use necessary consumer products.

- some experts feel a new approach is now warranted, given the growing population of handicapped consumers.

- economic considerations have tended to discourage research in this area. Adaptations will be made if they are profitable.

- a number of manufacturers have produced devices such as special knobs. However, these are few in number.

- the 'safety' of children factor has been given special attention, often to the detriment of others. Standards do not consider the needs of the handicapped.

- some designs useful to the handicapped have been discontinued due to new designs and models. For example one oven manufacturer has discontinued a side opening door.

- there is a major need for more product information to be available in the form of pamphlets, fact sheets, and information packages.

- there is a need for co-operation between the consumer, government and manufacturer.

The information derived from these interviews was useful to the researchers in terms of understanding the complexity of the problem for the handicapped, rehabilitation personnel, marketing managers and product designers.

4.4 Results From Handicapped Panel Discussions

Twenty-seven handicapped consumers participated in the study and represented a range of functional impairments and socio-economic backgrounds. The breakdown of functional problems was:

	CALGARY	HAMILTON	MONTREAL	TOTAL	% AGE
Mobility	5	5	6	16	61%
Tactile	3	2	2	7	23%
Hearing	1			1	4%
Sight	1	1	1	3	12%
TOTAL	10	8	9	27	100%

All participants lived in rented apartments or their own homes. Several were students; about half worked outside the home. Twice as many of the respondents were women and all ages ranged from 19-55 years of age with the model age being 35. Income also varied. Several were conspicuously affluent where one respondent was married to a senior judge. Several were on income support programs, but the majority were of moderate income. A handful used special

transportation services to come to the meeting. All meetings were held in accessible buildings.

The Ash[21] study was examined to compare his findings with the products selected in this study. Perhaps one finding of this study can be said to be that measures of "normal" consumer satisfaction with a product do not necessarily include the handicapped. Also, normal consumer complaints are often secondary in importance to the handicapped.

Ash[22] reports that warranty problems, inferior quality of materials and workmanship are major complaints. This study found otherwise. Earlier the concepts of use and usefulness were discussed. The former is more critical to the handicapped consumer, while the latter more often is typical of normal consumer complaining behaviour.

Also, while many major and small appliances were not rated highly as dissatisfaction priorities in the Ash study for the normal consumer, the handicapped consumer sees these as basic goods critical for independent living. For example, ovens were more often problematic for handicapped consumers than for those in Ash's study. Further, while a

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21. Ash, op. cit.

22. Ibid.

refrigerator may not be a frequent acquisition, for a handicapped consumer it is most important to begin organizing their own affairs. The handicapped are more basic in their evaluation of products and thus less often focus on workmanship or warranty problems. Their main concern is "Can I use this product"? As long as products are designed to prevent full utilization by all consumers it is unlikely a strong correlation between the needs of the normal and the handicapped consumer can be seen.

The basic theoretical construct used (see Section 3.3) for the discussions was supported by the panels. In general, they frequently felt constrained by many of the functional and operating requirements of appliances and other products, often hesitating in their purchase. In addition, several mentioned the need to have products adapted for their use, at extra cost to them or their families. These extraordinar expenses, accumulated over time are quire substantial. Several mentioned these costs as "penalties for being handicapped". Sometimes personal adaptations were purchased at a low cost, but several people were hesitant to share their innovations because they suspected manufacturers would co-op them and would charge more than they should and "exploit handicapped consumers".

Three major areas of concern about all appliances were identified. These were (1) Design of Controls; (2) Design of Doors; and, (3) Access (reaching in).

1. Controls

With all the appliances, most respondents agreed that using any controls pose the greatest difficulty, regardless of the physical impairment. Whether it was to defrost the fridge, turn on the stove or oven, the dishwasher or the washer and dryer, the controls were either not within reach (for those in a wheelchair), or if balance and co-ordination was a problem, their strength and fine motor co-ordination was inadequate to manipulate the dials (for those with tactile problems). If blind, it is impossible to set any controls without first marking them in such a way as to raise the setting markings in order to feel them. Controls on most modern appliances are almost always located on the top or at the back of the appliance. All agreed this was a major problem.

Besides the inconvenience and/or frustration of not being able to reach the deals, a serious danger exists in using the stove when a person has to reach across hot burners to change the controls. This is particularly dangerous for the

quadraplegic who has no feeling in his arms and can be unaware of being burned until it is too late. Nevertheless, it is also very dangerous for anyone in a wheelchair who is sitting too low to be able to reach high enough to attain sufficient clearance. For the blind, they often can not be sure what controls are pushed and which burners may be heat sensitive. This poses the same danger when they have to reach across the burners to use the controls. Another difficulty with controls experienced by those with tactile problems was that even with pushbuttons difficulty arises if the buttons are set to close together. Often they have to use a fist (or back of the hand using knuckles as the contact point) and miss the control needed or all are pushed.

Timers on any appliance are essentially useless. People in wheelchairs can not reach these controls; those with tactile problems are not able to turn the dials; the deaf are not able to hear the buzzer and the blind are not able to feel the settings on the clock to set the timer. Fan and light buttons on stoves are out of reach.

Design ideas put forward with regards to appliances controls were:

- For the blind or those with failing vision, tactile markings similar to the dots on a braille watch could be used. Removal of plastic shields on clock faces or dial faces would also serve the same purpose. Digital clocks were not encouraged.

- Controls should be placed closer to the front. One young mother noted that care had to be taken so that the dials were not too accessible for young children. They should be out of sight of young children, and as the children grew enough to be able to see them, hopefully they would be sufficiently mature to use the controls themselves.

- The height of the dials could vary and be staggered in their location rather than being in a row for those with tactile problems.

- Push buttons and slide controls (similar to those on stereos) are superior to turning dials for various settings.

- Instead of relocating all dials, an alternative suggestion was to install an accessible master

switch for purposes of being able to turn a stove off before proceeding to work. For example on the stove, all burners would be turned off before a person attempted to lift a pot off or adjusted a dial at the back of the stove.

- Installing a flashing light along with a buzzer on a timer would greatly assist the deaf in using this control.

- Controls in washer-dryers were found to have a greater amount of resistance than controls on other appliances.

2. Doors

A second major difficulty experienced by most of the participants centered around door design.

In order to open a door, pulling handles posed the first obstacle. If the handle is not solid and fixed, those with tactile problems were not able to open doors on ovens, refrigerators, dishwashers, washers, or dryers. Second, enough space (at least four inches) has to be available

between the door and the handle in order to slide a hand behind the handle and pull if the person was not able to grip. Curved handles, filp handles, or ones flush with the door with only a lip on one side or edge are all almost useless for the handicapped.

For those on crutches and cases, pulling the door open in difficult if there is too much magnetism (as on a refrigerator door). Once the door is open, however, there is no difficulty moving it.

Doors that open sideways leave much more room to move in a small space (as opposed to an oven door which opens down). In addition, reaching into an appliance is made much easier if one does not have to reach over the door to get inside.

Doors which open more than 900 and have a safety lock to keep them in position are recommended as well for greater accessibility to the inside of appliances.

Another suggestion made concerning door design was to make the doors deeper and utilize more of the door space which is presently wasted; alternatively, oven doors could roll up into the oven.

Lastly, the suggestion was made to design doors which are halved with hinges on each side (similar to shutters which open from the centre and can be swung back); but in a fridge to keep the freezer compartment separate and at the bottom of the fridge.

3. Access Inside Appliances

It was not as easy to think of alternate designs which could be applied to all in this third area of general difficulty, in terms of height and reaching into the appliances. For example, for those in wheelchairs, most appliances are too high to be used easily, but for people with arthritis, many parts of the appliances are too low for them to reach because of their inability to bend.

Design suggestions that were agreed upon however, included:

- More use of lazy susan shelving. For example, in the refrigerator this would alleviate the problem of reaching to the back as well as some of the difficulty in reaching either up or down. The group agreed this would help the non-handicapped also by making it easier to reach in as well as clean the appliance.

- If the burners are level with the range top, transferring pots is easier and less dangerous (on some gas models particularly, the surface is not level because different parts of the burner protrude above the level of the stove).

- As an optional feature, bottom storage drawers in a stove could be removed thereby lowering the height sufficiently for those in wheelchairs.

- Appliances which can be designed in a manner of making them lower and wide with the same square footage would alleviate the problem of reaching so far to the back and provide more area at the front to manoeuver wheelchair, crutches, etc.

- Placing the freezer in a refrigerator on the bottom rather than at the top was preferred by all. It is easier to lift heavy food items as well as to clean and defrost.

- The addition of a cantilevered shelf in the freezer would also be helpful.

- Corners in any appliance should be rounded, not squared, in order to make cleaning easier.

Other Expressed Difficulties with Individual Appliances

. Refrigerators

Meat and vegetable crisper drawers in refrigerators are often not used by those with tactile problems because of (1) inability to grasp the handle, and (2) insufficient strength to pull the drawer out, especially for arthritics who have "fused wrists" and are unable to supinate their forearms.

The problem could be alleviated using the same principles of handle design previously mentioned (a solid fixed bar) and putting drawers on rollers. Also, leaving one end of the handle open would facilitate sliding a hand behind same. For the blind, temperature controls were not accessible.

. Dishwashers

Most of the participants had used a dishwasher and agreed top loaders were of little use.

Although those in wheelchairs found the same problem with the door opening down as they did with an oven door, they decided that a side-opening door would create too many

design problems because a trough would have to be installed to catch the water. Instead, if the trays were able to slide out further, the problem of reaching so far to the back would be alleviated.

. Washers/Dryers

Again it was mentioned that op loaders are too high for convenient use by anyone in a wheelchair. To lift out heavy, wet laundry from a top loader is extremely difficult, if not nearly impossible. However, the concern was expressed that front loading machines do not last as long as a result of having to seal off so much water.

Push and pull control buttons are again impossible to use by those with tactile problems.

If living in an apartment, where coin operated machines are provided, the money-boxes are difficult to reach at the back, and require considerable strength and co-ordination to use. If they were moved closer to the front, the group agreed it would be somewhat easier.

The lint trap on a dryer is also very difficult to reach if located at the back. One located in the door is ideal.

The lint trap on a dryer is also very difficult to reach if located at the back. One located in the door is ideal.

Because the reading of instructions and dials is not possible for the blind, it was suggested that a braille temperature plate be fitted over the buttons. sound and light signals should express cycles for the blind and deaf respectively.

Other Comments

Following the discussions on the selected durable products, the panels were asked to comment on other product dissatisfactions and where possible to make some suggestions.

Food processors, toasters, choppers, slicers, etc. also present similar difficulties in poor handle design and control design. Changing buttons to slide controls which are also staggered or having a master switch was again recommended by those with tactile problems.

Thermostats create difficulties because of their height (for wheelchair persons) and small dial lettering (for the blind). Again, raised dots were recommended.

Vacuum cleaners are generally difficult to move around, with the exception of a cannister type which moves in any direction with little effort. This was considered the most difficult of household tasks. Those in wheelchairs and on crutches frequently find themselves cornered and of course they cannot carry the appliance up or down stairs. A vacuflow system is ideal, but very costly. Also mentioned were cords getting tangled, drag problems and cumbersomeness for all.

Shopping for groceries in a wheelchair is another major problem area. Entrances to shopping aisles and cashier exits are too narrow, the top shelves are too high and pushing an ordinary cart difficult. One suggestion was for special wheelchair shopping carts, preferably ones in which the handicapped person could sit in and use levers to raise or lower himself or herself to reach items on shelves.

Other product problems dealt with pile rugs and heavy doors. Washroom fixtures including toilets, paper dispensers, taps and bathtubs were all presented as problematic.

A special issues was the packaging of products - especially those involving nondurable goods. This includes perforated packages which do not open where it says "open here" or "push here", shrink packaging where excessive dexterity and strength is required, child-proof containers, spouts on packages, small caps on toothpaste and on personal care products, and so on. Frozen juice containers were also discussed. The area of packaging warrants more in-depth analysis since it controls the usability of essential foods.

Mobility in public places especially groceries and supermarkets presented problems detracting from the ability to do comparison shopping and assessing products on shelves. Panelists rallied against insensitive store clerks who react negatively to their physical impairments - often treating handicapped consumers as children or even with rudeness.

Summary

As discussions progressed it became apparent that there were some splits amongst the panelists, with those in wheelchairs having mobility, reach and height problems and those panelists having strength, balance, limited grasp and dexterity problems. In some cases, solutions for one group

might create a design problem for the other. There were also times when the difficulties of one group overlapped and common solutions were explored.

However it was also observed that many major appliances have a number of common problems dealing with controls, doors and reaching inside. If one problem persists it is the placement and design of controls. Control panels and knobs seem to be the part of an appliance which are most often changed when newer and more modern lines are created. Thus even if a manufacturer happens to hit upon a "good" design, there is no guarantee that it will be available on later models. The universal knob allows for full use. The placement of controls needs an indepth examination especially as it concerns safety and accessibility features. For example, the blade or wedge shaped control, is easily grasped by those with limited dexterity and is most accessible to all.

The major areas of concern and concomitant design suggestions are presented below in Table 1.

Table 1

SUMMARY OF DESIGN PROBLEMS AND SOLUTIONS[1]

Areas of Concern	Difficulty	Design Needs
1. Design of Controls	Unable to Reach	1) Change location to side or front of appliance (A) 2) Master switch (A)
	Unable to Manipulate	1) Push buttons/slide controls (M,T,S) 2) Vary height (M,T) 3) Stagger location (A) 4) Master switch (A)
	Unable to See	1) Tactile markings (S)
	Unable to Hear	1) Flashing lights (H)
	Unable to Grasp Handle	1) Solid, fixed handles with at least 4" clearance from door (M,T) 2) Leave one end of the handle open (M,T)
2. Doors	Insufficient Strength to Pull Door	1) Reduce suction on refrigerator door (M,T) 2) Halve doors (M,T)
	Insufficient Room to Move with Door Open	1) Open door sideways vs down (M) 2) Open door more than 90° with a safety lock (M,T,S) 3) Make doors deeper and utilize more door space (M,T) 4) Halve doors in refrigerator and ovens (M,T)

(continued) Table 1

SUMMARY OF DESIGN PROBLEMS AND SOLUTIONS[1]

Areas of Concern	Difficulty	Design Needs
3. Reaching inside appliances	Too High Too Low	1) Lazy susan shelving (A) 2) Level stove top (M) 3) Remove bottom storage drawer in stove (M) 4) All appliances should be lower and wider (M) 5) Freezer on the bottom vs the top of the fridge (M) 6) Cantilevered shelves (A) 7) Rounded not squared corners (A)

[1]NOTE: A code has been developed to provide explanation of which group of handicapped consumers presented which design needs. These letters are presented in parentheses beside each design need. The codes are:

Mobility - M
Tactile - T
Hearing - H
Sight - S
All - A

4.5 Results from Discussions with Trade Associations Representatives

Three meetings were held with representatives of product manufacturers. They were:

1. Retail Council of Canada
2. Electrical and Electronic Manufacturers Association of Canada
3. Grocery Products Manufacturers of Canada

Discussions incorporated the main concerns of the panels and how the findings could be used. Discussions were fluid and interactive.

All representatives felt that the results of the study were informative and possibly useful to their members.

A number of examples were provided by these representatives to illustrate how certain manufacturers have already responded in related areas. For example metobolic disorders require special foods. Collaboration between a private foundation and a manufacturer has led to a number of improvements.

It was felt that companies with R and D departments could easily incorporate handicapped consumer input at only marginal costs.

It was further stressed that the most manufacturers and producers have oriented their marketing to particular segments of the population. It appeared that the handicapped consumer segment should be further researched for its potential.

A number of normal consumer dissatisfactions such as those dealing with difficult packaging warranted further development. Thus a number of handicapped consumer dissatisfaction reported support this and were accepted as realistic concerns. Inevitably it was felt that the ultimate utilization of this study lay with the individual retailers and manufacturers. There was concensus that the eighties would be a decade of changing consumer habits and unpredictable response. As such entry into new markets was seen as sound practise.

Finally, the question arose concerning the responsibility of the federal government in this area. Suggestions were for federal government initiatives for information development

and dissemination for manufacturers and the handicapped, via the publication of fact sheets, bulletins and further research.

It is felt that these were constructive and informative meetings. Informants expressed interest in receiving and distributing the report. Several mentioned they would highlight the study in their newsletters and would appreciate a formal presentation of the report.

A final tendency of these managers was to state in qualified terms that they would like to see the final report (this document) prior to making any hard decisions.

PART V - RECOMMENDATIONS AND CONCLUSIONS

5.1 Recommendations

In general the results of this study speak to a number of issues and assumptions. These could be further refined as hypotheses and tested in statistical studies.

In the first instance it is apparent that the handicapped consumer is presently exempt from input into the design and production of essential products. These products could possibly find expanded markets within this market segment, given that the following recommendations are implemented. These recommendations are not in any order of importance nor prioritized. Rather, they reflect the changes required to make the market segment of the physically handicapped more visible and consuming.

1. There already exist a number of products that are readily available and which do not handicap particular users. Countertop stoves, self-defrost refrigerators, self-cleaning ovens, and other usable products should be identified, promoted in fact sheets and placed in the range of information services mentioned earlier in this report. Further, a "certification" should be placed on

the product, such as the international wheelchair access symbol, which has gained widespread use to communicate accessibility, usability and concern for the handicapped. Perhaps arrangements for this could be made with a group like the Canadian Rehabilitation Council for the Disabled and the various representative groups of manufacturers. Possibly this could be introduced in The Canadian Consumer's method of product testing. However this would have to be negotiated with the magazine.

2. A central bureau should be established by the federal government. It would provide product information on usable items. It should also test products to determine their usability. Alternatively, existing consumer information services should be reinforced with the aforementioned information and a campaign to reach out to the handicapped consumer should be undertaken. It should also be apparent that this could be a viable service disseminated through the future Telidon system. Also, the Bell Canada Consumer Center could be examined as a possible model.

3. Manufacturers should be encouraged, through the results of research to begin to incorporate the design needs of handicapped consumers. When product-testing, these

groups should use panels including people with functional impairments. As was seen in this study, special efforts in research and development do not cost substantially more and in redesign or remodelling plans certain changes can be made which would benefit all consumers. In general, this study found that advances in technology and electronics contribute to the usability of products for all consumers. Thus, where before a switching device created dexterity problems for some handicapped consumers, the touch button now allows for easy access and use.

4. When planning marketing and advertising strategies firms should be encouraged to emphasize, in a nonintrusive manner, the utility of their product for all consumers. This could be encouraged by having either the government in an independent body provide information booklets on these products, readily available to the handicappped consumer and to organizations and developers building and equipping apartment buildings.

5. While the central objective of this study was to examine the problems handicapped consumers have with essential products for daily living as a basis to estimate

consumer satisfaction, the results suggest a number of areas for further research. Currently no baseline data exists on the handicapped consumer, as it exists with the normal consumer[23]. A study incorporating statistical procedures could be used to frame a number of issues within a representative context.

Also, panels focusing on each of the four functional impairment areas (mobility, tactile, hearing and sight) separately should be used to further assess consumer satisfaction. Structured input should be based on realistic stratifications of handicapped consumer groups. As suggested it is inappropriate to suggest that the handicapped comprise a monolithic group. A universal design can only be achieved if all the input can be structured. However, while different impairments require some different design features there are a number which are helpful to all groups. These should be identified.

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23. Ibid.

By integrating objective test results and subjective feedback from consumers, a more comprehensive input to trade associations and manufacturers can be made.

6. This study identified three main problems of the handicapped consumer which tend to cut across the type of durable product. Controls, doors and access were aggregate categories that require further examination - product by product. As suggested a number of these products are now very usable, but no one in Canada has catalogued these. This would be a relatively inexpensive technique, helpful both to the handicapped consumer and the manufacturer.

7. The consumer dissatisfactions of the handicapped differ from the normal population. The usefulness of a product can only be determined <u>after</u> it becomes usable. As long as operations of a product remain beyond the functional abilities of the physically impaired, one cannot obtain the type of product satisfaction data as from the normal population. Efforts to explore this problem should be made.

8. The demand for products to be usable will increase. Estimates of projections suggest that the population

will show increased numbers of people with physical impairments. These people are in families and thus the demand is further increased in terms of population figures. Given the impact of public expenditures to remove the handicapped from welfare roles and to make them work-ready as well as making business environments accessible, on can suggest that this decade will reveal modifications to the income pyramid. Income levels will rise and the handicapped will increase their expenditures. Further research should contribute to a fuller understanding of the issues emanating from the handicapped market segment.

5.2 Conclusions

Those firms that wish to develop new markets or a competitive edge can examine the results of this study and begin in a cost-beneficial way to make their products more usable. A beginning suggestion is to identify those products that are not quite usable and work with trade associations and major organizations of the handicapped to provide conspicuous markings of accessibility (use). A second step could be to incorporate handicapped consumers in research and development activities when examining new models. Further, advertising can real a product's usability

via the previously mentioned access symbol. These are relatively innovative and inexpensive ways to begin systematic evaluation of the handicapped consumer's market potential. This study provides a beginning.

In commissioning this study the Department of Consumer and Corporate Affairs wished to explore how the handicapped consumer perceives his or her satisfaction with consumer products. This study was also designed to provide feedback to important trade associations. Finally, it was hoped that were a need identified then this could be met with a series of recommendations that could address handicapped consumers and product manufacturers.

In order to accomplish these objectives a series of steps were undertaken. These included a literature review, key informant discussions, three panel discussions with handicapped consumers and one panel of occupational therapists, and the development of an operational framework (priority list) for the analysis of products and discussions with trade association representatives.

The instrument on product analysis used is unique and can be adapted for almost any product - durable and non-durable. It follows a simple progression of items and summatively

concludes with "difficulties in operations", and "suggested ameliorations in design" as a reliable proxy for consumer dissatisfaction and satisfaction concerning use.

In the panels held with handicapped consumers, there were some differences amongst the panelists, with those in wheelchairs having mobility, reach and height problems and those panelists having strength, balance, limited grasp and dexterity problems. It was observed that in some cases, solutions for one group might create a design problem for the other. More often, the difficulties of one group overlapped and common solutions were described.

It was seen that most major appliances have a number of common problems dealing with controls, doors and reaching inside. If one problem persists it is the placement and design of controls. Control panels and knobs seem to be parts of an appliance which are most often changed when newer and more modern lines are created. Thus, even if a manufacturer happens to hit upon a "good" design, there is no guarantee that it will be available on later models. The placement of controls needs an in-depth examination especially as it concerns safety and accessibility features.

The study confirmed that there was a small amount of literature, that key informants saw a need for the study and that the panels corroborated the efficacy of the instrument in examining a product's usability.

The handicapped panelists were enthusiastic about the study and demonstrated a high degree of interest by their active, animated discussions. Thus it can be inferred that more work in this area would be welcomed. Trade association representatives appear to be responsive to this work.

The International Year of Disabled Persons in 1981 allows for the necessary incentive, public reception and a beginning to implement strategies in product design and manufacture that can begin to eliminate many of the handicapping features of products essential for the daily living requirements of physically impaired Canadians.

The science of normalization through improved consumer product design is in its infancy. Hopefully this study will begin to nurture the child.

APPENDIX 1

KEY INFORMANTS

KEY INFORMANTS INTERVIEWED

Eleanor Aronson
National Rehabilitation and Information Centre (NARIC)
Washington, U.S.A.

Professor Bourgeois
Carleton University
Ottawa, Ontario

Mr. M. Brown
CNIB
Toronto, Ontario

Ken Buswell
Consumer's Association
Ottawa, Ontario

Reference Department
C.I.S.T.I. (National Research Council)
Ottawa, Ontario

Jim Gale
Bell Northern
Ottawa, Ontario

Cardon Rehabilitation Products
Toronto, Ontario

George S. Day
Faculty of Management Studies
University of Toronto

Albert Deschamps
Canadian Manufacturers Association
Ottawa, Ontario

Mel Fruitman
Retail Council of Canada
Toronto, Ontario

Dr. Gupta
Health Protection Branch
Health and Welfare Canada

Marion Hall
ABLEDATA
Virginia, U.S.A.

Heather Jones
Canadian Rehabilitation Council for the Disabled (CRCD)

Charles Laenger
IMPART
San Antonio, Texas

Linda Larecctia
Canadian Standards Association

John McNeice
Bell Canada
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Phillip Moyes
Grocery Products Manufacturers Association of Canada
Toronto, Ontario

Alda Murphy
Electrical and Electronic Manufacturers Association of Canada
Toronto, Ontario

Julie Petersen
National Handicapped Housing
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Dr. O. Roy
National Research Council
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Reference Centre
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Walton Sparks
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APPENDIX 2

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